

# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Article 36 and Rule 70)

Applicant's or agent's file reference Case 22246	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/EP2005/003117	International filing date ( <i>day/month/year</i> ) 23.03.2005	Priority date ( <i>day/month/year</i> ) 25.03.2004
International Patent Classification (IPC) or both national classification and IPC INV. A61K7/42		
Applicant DSM IP ASSETS B.V.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 9 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 6 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the opinion
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand  25.01.2006	Date of completion of this report  30.06.2006
Name and mailing address of the international preliminary examining authority:   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer  Krattinger, B  Telephone No. +49 89 2399-8550  

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**I. Basis of the report**

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

1-43 as originally filed

**Claims, Numbers**

1-12 received on 18.04.2006 with letter of 13.04.2006

**Drawings, Figures**

1-3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.: 13-16
- ☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	1-12
Inventive step (IS)	Yes: Claims	
	No: Claims	1-12
Industrial applicability (IA)	Yes: Claims	1-12
	No: Claims	

2. Citations and explanations

**see separate sheet**

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**Re Item I**

The amendments meet the requirements of Art. 34(2)(b) EPC and are acceptable.

**(Re Item III)**

The claimed matter as filed has not been fully searched for the following reasons :  
It is well known that conjugated or aromatic systems show absorption peak in the UV.s especially over 270 nm. The scientific litterature alone describes an extremely high number of dendrimers containing phenyl, naphthyl, anthracenyl, bipyridine, tripyridine... moieties which are all chromophores having an UV absorption lambda maximum greater or equal to 270nm. For claim 1 as it is presently drafted, the search lead to an overflow of documents showing that the subject matter of claim 1 as it is presently drafted is obviously not new (see for example documents D15, D16 and D18 as defined in section V).

Therefore the search has been restricted and is incomplete. It has been restricted to conjugate comprising a hyperbranched polymer covalently bonded to at least three UV absorbing chromophores having an UV absorption lambda maximum greater or equal to 270nm, the chromophores being as defined from page 20, lines 19 to page 26 lines 5, compositions containing such polymers and their use.

Therefore the subject matter of claims 1-12, 14-16 as filed is searched partially, the subject matter of claim 13 as filed is searched entirely.

**Since amended claim 1 now relates to cosmetic compositions based on dendrimers that were disclosed in claim 13 as filed or in the description from page 20, lines 19 to page 26 lines 5 as filed, it is considered that the amended claimed matter as send with the letter dated 13-04-2006 has been fully searched)**

**Re Item V**

Reference is made to the following documents:

- D1: WO 03/037830 A
- D2: US-A-6 114 489
- D3: US-B1-6 497 959
- D4: WO 02/092668 A
- D5: WO 97/12882 A
- D6: EP-A-1 277 770
- D7: US-A-5 663 247)

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- D8: US-A-6 037 444  
D9: WO 02/077074 A  
D10: US-B1-6 743 889  
D11: FR-A-2 757 389  
D12: WO 93/04665 A  
D13: US-A-5 618 520  
D14: US-A-5 089 250  
D15: CHEMICAL REVIEWS, vol. 99, 1999, pages 845-880, XP000960497  
ISSN: 0009-2665  
D16: CHEMICAL REVIEWS, vol. 97, no. 5, 1997, pages 1681-1712,  
XP002082739 ISSN: 0009-2665  
D17: US-A-5 403 944  
D18: BIOCONJUGATE CHEM., vol. 15, 12 June 2003 (2003-06-12), pages 162-  
167, XP002333387

**Novelty**

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1-12 is not new in the sense of Article 33(2) PCT.

Claim 8 of document D1 defines hyperbranched polymer covalently bound to chromophores like benzophenone (claims 1-2, 14) as UV sunscreens (claim 23). Document D1 does not specify how the benzophenone molecules are bound to the dendrimer. Thus the claimed matter is novel.

Document D2 concerns hyperbranched polymers containing UV and light stabilizer units like piperizyl, pyperidyl, acrylate or camphoric but does not provide indication about the binding between the polymer and the UV moieties. Furthermore D2 does not concern the cosmetic field. Thus the claimed matter is novel.

Document D3 discloses dendrimers terminated by benzophenone, or phenyl salicylate to improve the UV resistance but does not provide indication about the binding between the polymer and the UV moieties. D2 concerns thermoplastic resins. Thus in view of the content of D3, the claimed matter is novel.

Document D4 discloses hyperbranched polymers containing UV-light absorbers like benzophenone, hydroxybenzophenone....as UV-stabilizers. D4 does not concern or refer to the cosmetic field. Thus in view of the content of D4, the claimed matter is novel.

Document D5 discloses dendrimers terminated by benzotriazole groups which are not considered any more in the amended set of claims. D5 does not concern or refer to the cosmetic field. Thus in view of the content of D5, the claimed matter is novel.

Document D6 discloses dendrimers terminated by cinnamic moieties as photoreactive group. In D6, the cinnamate moiety is bound by a  $-C=O-O-$  group whereas in the claimed matter, it is bound by an O atom. Furthermore D6 does not concern or refer to the cosmetic field. Thus in view of the content of D6, the claimed matter is novel.

Document D7 discloses dendrimers terminated by benzoic acid or p-t-butylbenzoic acid stoppers. However D7 does not concern or refer to the cosmetic field. Thus in view of the content of D7, the claimed matter is novel.

Document D8 discloses a dendrimer terminated by groups of formula V-E. However said dendrimers is not found in combination with ingredients which are cosmetically acceptable (but THF,  $CH_2Cl_2$ ,...). Thus in view of the content of D8, the claimed matter is novel.

Document D9 discloses dendrimers terminated by salicylate groups of formula (dendrimer)-O-CO-(phenyl)(o-OH). They are found in perfume composition, i.e in compositions which can be considered as cosmetic compositions (page 10, lines 15 and 27; claims 1-6). There are used in cosmetic compositions (claim 11). The fact that the salicylate is released or is used as a odoriferous ingredients is not taken into account to assess novelty. Thus in view of the content of D9, the subject matter of **claims 1-12 is not novel**.

D10 discloses dendrimers based on 4-hydroxybenzophenone, while the claimed dendrimers are terminated by 2-hydroxybenzophenone. Thus in view of the content of D10, the claimed matter is novel.

Document D11 concerns cosmetic composition based on dendrimers and UV-filters.

Document D1 can be considered as closest prior art. It discloses cosmetic compositions comprising an hyperbranched polymer covalently bonded to UV-absorbing chromophores as UV-filters in sunscreen compositions. The chromophore can be of various type including cinnamate, salicylate, camphor, benzophenone,...etc. (see claim 23; page 2, line 34; page 10, first paragraph). However document D1 does not disclose the various chromophores and their binding to the dendrimers as defined in the presently claimed matter.

Thus the problem to be solved by the present application is the provision of alternative UV-filter hyperbranched polymers.

The claimed solution consists of covalently binding known UV-filter agent to dendrimers. D1 teaches that the chromophores, whatever the binding is, are still UV-absorbing agents; D9 teaches the binding of the group V-E (see novelty objections above).

Documents D12-D14 and D17 confirm that the UV-filter properties of chromophores used in cosmetic are maintained when they are bound to polymers (D12-D14, D17: claims, examples) and documents D2-D5 confirm that chromophores bound to dendrimers show UV resistance and thus are still UV-filter. (D2: column 11, lines 5-35; D3: column 3, table; D4: page 9, lines 17-18; D5: page 1, lines 1-2).

D1, D9 and D11 also teach that dendrimers can be used in cosmetic compositions, including in sunscreen (D1, D9: see citations above; D11: claims, examples).

In light of the prior art, it is clear that UV-filters used in cosmetic will still be UV-filters usable in cosmetic when they are bound to any type of polymers, including dendrimers. Furthermore it is clear that dendrimers are used in cosmetic.

Thus it is obvious to bind UV-filters to dendrimers to arrive to the claimed compositions in view of the content of the prior art. Therefore the claimed matter does not involve an inventive step.

The claimed matter should be restricted to embodiments which are 1. new and 2. which show surprising effects.

### **Re Item VIII**

1. To avoid any ambiguity, claims 5, 6 and 8 should specify that the chromophore groups are as in claim 1.

2. When the present application enters the European Regional Phase, a non unity

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objection could be raised since cosmetic compositions based on hyperbranched polymers covalently bonded to UV absorbing chromophores are already known from D1 and D2 so that each of the chromophores as defined in present claim 1 could be associated to one invention.